

Serial No.: 10/068,307
Conf. No.: 9297

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Art Unit: 2133

REMARKS

In response to the Office Action mailed September 9, 2004, Applicants respectfully request reconsideration.

The Office Action acknowledges Applicants' claim for priority. However, the Office Action states that Applicants have not filed a certified copy of the priority application. Applicants would like to point out that a copy of the priority document was filed on April 29, 2002. A copy of the return postcard, transmittal letter and copies of the first three pages of the priority document are enclosed that demonstrate that Applicants did in fact file the required certified copy of European application no. 01301092.1. Therefore, Applicants respectfully request that the next action in the application confirm receipt of the priority document and that the requirements for perfecting the priority claim pursuant to 35 U.S.C. §119 have been satisfied.

Claims 4, 5, 8, 9, 16, 17, 20, and 21 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite. The Office Action points to a number of antecedent basis issues in the claims. In response to this rejection, Applicants have amended the claims to overcome all of the noted deficiencies and believes that the claims are now clear enough to satisfy the statute.

The Office Action also objected to the Summary of the Invention. In response to this objection, Applicants have rewritten the Summary of the Invention so that the subject matter of the invention is described in one or more clear, concise sentences or paragraphs. Accordingly, Applicants believe this objection has been overcome and respectfully requests its withdrawal.

Claims 1-3, 6, 7, 13, 14, 18, and 25 were rejected under 35 U.S.C. §102(b) as being anticipated by Heybruck. Applicants respectfully traverse this rejection.

Heybruck describes apparatus for testing a field programmable logic gate array, in which an input multiplexer 22 can select between a functional input and pseudo random program generator (PRPG) input. The output of the input multiplexer is then passed to the input register which is then passed to the circuit element under test. Similarly the circuit under test outputs a result value to the output register and also to a multiple input signature register (MISR). The outputs of both the output register and the MISR are input to an output multiplexer which selects either the output from the output register or the MISR to the output. The input register 23 is

positioned between the output of the input multiplexer and the circuitry and therefore cannot supply the PRPG with an input.

By contrast, claim 1 recites test circuitry for testing an integrated circuit, the integrated being configurable to accept input data from stimulus scan cells and to provide output data to response scan cells. The test circuitry including stimulus circuitry for providing test data to the integrated circuit; input selection means operable to control which of the test data and the input data are received at the integrated circuit; capture circuitry for capturing output data from the integrated circuit and generating response data; output selection means operable to select which of the output data and the response data are received by the response scan cells. Clearly, Heybruck does not teach or suggest that the integrated circuit is configurable to accept input data from stimulus scan cells and to provide output data to response scan cells as recited in claim 1. Accordingly, claim 1 distinguishes over Heybruck and is in allowable condition.

Claims 2-10 depend from claim 1 and are allowable for at least the same reasons.

Claim 13 recites a method of testing an integrated circuit using test circuitry associated therewith, the test circuitry including stimulus circuitry; input selection means; capture circuitry; and output selection means; the integrated circuit being configurable to accept input data from stimulus scan cells and to provide output data to response scan cells, the method including the steps of: providing test data to the integrated circuit from the stimulus circuitry; operating the input selection means to control which of the test data and the input data are received at the integrated circuit; capturing output data from the integrated circuit using the capture circuitry; generating response data based on the output data; operating the output selection means to select which of the output data and the response data are received by the response scan cells. As discussed above in connection with claim 1, Heybruck does not teach or suggest at least the integrated circuit being configurable to accept input data from stimulus scan cells and to provide output data to response scan cells. Accordingly, claim 13 distinguishes over Heybruck and is in allowable condition.

Claims 14-22 depend from claim 13 and are allowable for at least the same reasons.

Claim 25 recites test circuitry for testing an integrated circuit, the integrated circuit being configurable to accept input data from stimulus scan cells and to provide output data to response

scan cells, the test circuitry including: stimulus circuitry for providing test data to the integrated circuit; input circuitry operable to control which of the test data and the input data are received at the integrated circuit; capture circuitry for capturing output data from the integrated circuit and generating response data; output circuitry operable to select which of the output data and the response data are received by the response scan cells. As discussed above in connection with claim 1, Heybruck does not teach or suggest at least the integrated circuit being configurable to accept input data from stimulus scan cells and to provide output data to response scan cells. Accordingly, claim 25 distinguishes over Heybruck and is in allowable condition.

Claims 11, 12, 23, and 24 were rejected under 35 U.S.C. §102(e) as being anticipated by Ngo et al. Applicants respectfully disagree with this rejection.

Ngo describes apparatus for performing programmable built in self testing of memory wherein, rather than saving all data subsequent to a first section of a memory failure, only a single memory block of data values is saved.

By contrast, claim 11 recites test circuitry for testing an integrated circuit, the test circuitry including stimulus circuitry and capture circuitry, the stimulus circuitry including a dictionary storing a plurality of read/write operation primitives, the primitives being combinable to form at least a first read/write testing sequence; and a librarian sub-block for receiving the input data, the input data being indicative of a test to be applied to the integrated circuit, the librarian sub-block being configured to control, on the basis of the input data, which of the primitives are provided to the integrated circuit, and the order in which they are provided, based on the input data; wherein the capture circuitry captures response data from the integrated circuit.

Although Ngo describes the use of an instruction register for storing instructions to be carried out to test the memory and a program counter which points to a specific element within the instruction register, this is not a dictionary storing a plurality of read/write operation primitives, the primitives being combinable to form at least a first read/write testing sequence and a librarian sub-block for receiving the input data the input data being indicative of a test to be applied to the integrated circuit. Accordingly, claim 11 distinguishes over Ngo and is in allowable condition.

Claim 12 depends from claim 11 and is allowable for at least the same reasons.

Claim 23 recites a method for testing an integrated circuit using test circuitry, the test circuitry including stimulus circuitry and capture circuitry, the stimulus circuitry including: a dictionary storing a plurality of read/write operation primitives, the primitives being combinable to form at least a first read/write testing sequence; and a librarian sub-block; the method including the steps of: receiving input data at the librarian sub-block, the input data being indicative of a test to be applied to the integrated circuit; selecting, on the basis of the input data and using the librarian sub-block, one or more of the primitives and an order of the primitives so selected; providing the selected primitives to the integrated circuit in the selected order; and capturing response data from the integrated circuit using the capture circuitry. As discussed above in connection with claim 11, Ngo does not teach or suggest a dictionary storing a plurality of read/write operation primitives, the primitives being combinable to form at least a first read/write testing sequence and receiving input data at the librarian sub-block, the input data being indicative of a test to be applied to the integrated circuit. Accordingly, claim 23 distinguishes over Ngo and is in allowable condition.

Claim 24 depends from claim 23 and is allowable for at least the same reasons.

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CONCLUSION

A Notice of Allowance is respectfully requested. The Examiner is requested to call the undersigned at the telephone number listed below if this communication does not place the case in condition for allowance.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 23/2825.

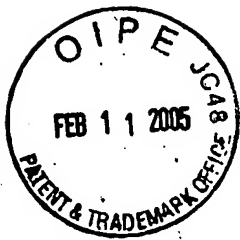
Respectfully submitted,

*Steven FIRTH and William Bryan BARNES,
Applicant(s)*

By: 

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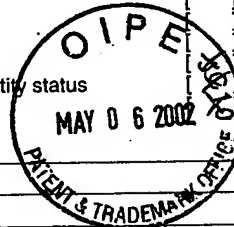
Docket No.: S1022.80845US00
Date: February 9, 2005
x02/09/05x



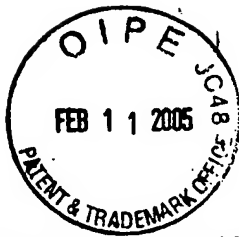
Serial No. 10/068 307 File No. 501022/80845 By: JHM
Title: BUILT-IN TEST SUPPORT FOR AN INTEGRATED CIRCUIT
Application of STEVEN CUTHBERT WGS Date: 5-7-02

The U.S. PTO Mail Room acknowledges receipt of the following on the date stamped hereon:

<input type="checkbox"/> Mailing by Express Mail (37 CFR 1.10) Express Mail Label No. _____	<input checked="" type="checkbox"/> Provisional Application Cover Sheet
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<input type="checkbox"/> Non-provisional <input type="checkbox"/> Provisional	<input type="checkbox"/> Inf. Discl. Statement, PTO Form 1449
Incl. _____ pages, (_____ pgs) Specification,	<input checked="" type="checkbox"/> References Cited
(_____ pgs) Abstract, (_____ pgs) Claims (_____ # claims)	<input checked="" type="checkbox"/> Priority Document(s) # <u>01301092.1</u>
<input checked="" type="checkbox"/> Design Patent Application	<input checked="" type="checkbox"/> Copy of Notice to File Missing Parts
Declaration(s) _____	<input checked="" type="checkbox"/> Amendment/Response
<input checked="" type="checkbox"/> Drawings <u>3</u> Sheet(s) (FIGS. <u>1-4</u>)	<input checked="" type="checkbox"/> Petition for Ext. of Time (x2)
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DATE MAILED 4-29-02



Attorney's Docket No. S01022/80845

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Steven FIRTH and William Bryan BARNES
Serial No.: 10/068,307
Filing Date: February 6, 2002
For: BUILT-IN TEST SUPPORT FOR AN INTEGRATED CIRCUIT

Examiner: Unassigned
Art Unit: 2858

Box Missing Parts
Commissioner for Patents
Washington, D.C. 20231

Sir/Madam:

Transmitted herewith for filing is/are the following document(s):

- ☒ Notice to File Missing Parts
- ☒ Declaration and Power of Attorney
- ☒ 3 Sheets of Formal Drawings
- ☒ Information Disclosure Statement, PTO Form 1449 and Cited References
- ☒ Certified Copy of European Priority Application No. 01301092.1
- ☒ Return Post Card

If the enclosed papers are considered incomplete, the Mail Room and/or the Application Branch is respectfully requested to contact the undersigned collect at (617)720-3500, Boston, Massachusetts.

The enclosed check includes a \$740.00 filing fee, \$130.00 surcharge and \$258.00 additional claim fee for a total of \$1,128.00. If the fee is insufficient, the balance may be charged to the account of the undersigned, Deposit Account No. 23/2825. A duplicate of this sheet is enclosed.

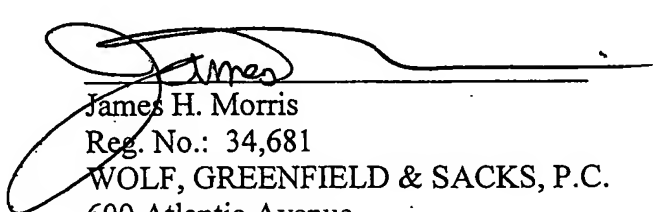
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Attorney Docket No.: S01022/80845
X05/07/02

Respectfully submitted,



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Patentanmeldung Nr. Patent application No. Demande de brevet n°

01301092.1

Der Präsident des Europäischen Patentamts;
Im Auftrag

For the President of the European Patent Office

Le Président de l'Office européen des brevets
p.o.

R C van Dijk



Blatt 2 der Bescheinigung
Sheet 2 of the certificate
Page 2 de l'attestation

Anmeldung Nr.:
Application no.: 01301092.1
Demande n°:

Anmeldetag:
Date of filing: 07/02/01
Date de dépôt:

Anmelder:
Applicant(s):
Demandeur(s):
STMicroelectronics Limited
Almondsbury, Bristol BS32 4SQ
UNITED KINGDOM

Bezeichnung der Erfindung:
Title of the invention:
Titre de l'invention:

Built-in test circuit and method for an integrated circuit

In Anspruch genommene Priorität(en) / Priority(ies) claimed / Priorité(s) revendiquée(s)

Staat:
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International Patent classification:
Classification internationale des brevets:

G11C29/00

Am Anmeldetag benannte Vertragsstaaten:
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Etats contractants désignés lors du dépôt:

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Remarks:
Remarques:

BUILT-IN TEST SUPPORT FOR AN INTEGRATED CIRCUIT

FIELD OF INVENTION

The present invention relates to testing of integrated circuits using built-in testing circuitry.

The invention has been developed primarily for use in testing memory circuitry, and will be described hereinafter with reference to this application. However, it will be appreciated that the invention is not limited to this particular use and can be applied to many other types of integrated circuits having scan chains for data input and output.

BACKGROUND TO INVENTION

Presently, memory testing at integrated circuit level is usually handled in one of two ways. For relatively small memories (say, about 500 bytes or less), existing scan chains can be used. For example, referring to Figure 1, data is fed serially into stimulus scan cells 10 until they contain the desired input values. The output of the stimulus scan cells 10 is then clocked into a memory location within memory block 11. The memory location is read out into response scan cells 12, and the output is compared with that the original input. This can be done using, for example, a comparator (not shown).

There are a number of standard test data sequences that are used within field of memory testing. These tests are called Marinescu XN tests, where X represents the number of read/write

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